Monograph

OF THE

BIVALVE SHELLS

OF THE

RIVER OHIO.

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MONOGRAPH

OF THE

FLUVIATILE BIVALVE SHELLS

OF THE RIVER OHIO,

CONTAINING

Twelve Genera & Sixty-eight Species.

Translated from the French of C. S. Rafinesque, Prof. Bot and Nat. Hist. in Transylvania University.

PHILADELPHIA:

J. DOBSON, 108 CHESNUT STREET.

1832.

Adam Waldie, Printer.

TO

WILLIAM HEMBEL, Esquire,

ONE OF THE VICE PRESIDENTS OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, &c.

Dear Sir,

In publicly addressing to your notice a translation of Prof. Rafinesque's Monograph of the bivalve shells of the river Ohio and its tributaries, it seems proper to remark, that this paper was originally published at Brussels, in September, 1820, in "*les Annales générales des Sciences physiques.*" Extra copies were transmitted to the author in this country, who distributed them among individuals, and the libraries belonging to

scientific institutions in this city and elsewhere. It is therefore a curious circumstance in the history of American Conchology, that this singular evidence of the author's acumen, zeal and industry, should thus have existed for more than eleven years, while but *four* of the numerous species discovered and described by him, are known by his names, either in the works of American authors or in our collections.

You will perceive, that the definitions as to positions of the parts of the animal, in relation to its shelly covering, now understood and adopted by several eminent naturalists, whose knowledge and opinions of their anatomical structure are esteemed authentic, have been employed by Mr. RAFINESQUE; thus, when the shell is held so as to bring the *apices* or beaks uppermost, and the *ligament* between them and the eye, it presents also the *dorsal* or *hinge* margin: this is nearly the natural position of the shell;—

the margin or edge opposite to this, is the *basal margin;* that in front, the *anterior margin;* and that portion of the shell nearest to the observer, the *posterior margin.* When the shell is held in this manner, the *right* and *left valves* are also determined by their relative position to that of the observer.

At the same time that Mr. Rafinesque subdivides the species into *genera* and *sub-genera*, he likewise retains throughout the work, for reasons assigned in his preliminary remarks, the genus Unio as established by Bruguiere; this arrangement will be found satisfactory, because it prevents ambiguity, and will enable the student to adopt his generic terminology at discretion.

I have much pleasure in stating, that most of the Shells described in the following pages, have been placed in my cabinet by Mr. Rafinesque, with his labels and references.

A desire to facilitate the study of this interesting branch of American Conchology, was my inducement to undertake this translation. It is a fascinating subject, and has afforded me many hours of pleasing and instructive recreation. Be pleased to accept it, as a testimonial of my respect for your zeal and liberality in the promotion of the cause of natural science.

C. A. POULSON.

Philadelphia, October, 1831.

EXPLANATION OF THE PLATE.

The accompanying figure of the UNIO VERRUCOSA OF RAF. (described page 37) is intended to illustrate the following parts of the *Unio*:—From A to D the *dorsal* or *hinge margin*, which comprises the *beaks* or *apices*, as well as the *ligament;* D to B the *anterior margin;* A to C the *posterior margin;* and C to B the *basal margin*. The *right valve* is represented.

MONOGRAPH, &c.

THE numerous fresh-water and terrestrial shells which inhabit the interior of North America, had not been observed nor described when I undertook this task in the years 1818 and 1819. I was surprised and delighted to find, that they were nearly all new species, differing entirely from those found in the vicinity of the Atlantic; so that it appears the chain of the Allegheny mountains which divides the country, forms a distinctive line between the fish and shells of the waters of the Ohio and its tributaries, and those of the rivers emptying into the Atlantic ocean. Though very far from having exhausted the study of the shells of this region, I have however observed there, collected and figured, about one hundred and eighty species; of these nearly *seventy* are fluviatile univalves; *fifty* terrestrial univalves and *sixty* fluviatile bivalves. I now propose to describe the latter, the univalves will be described elsewhere. I have already published many, and particularly the new Genera, in my Prodromus of the new animals of North America.

The greater number of the bivalves of the Ohio are found also in most of its tributary streams,

such as the Kentucky, Cumberland, Tennessee, Wabash, Miami, Green, Scioto, Licking, Muskingum, Kenhawa, &c. many of which are considerable rivers, of from five to eight hundred miles in length. It remains to be ascertained whether they are common to the whole of the valley of the Mississippi, to the Missouri, Arkansa, &c. I am certain some have been found there, and think it probable that the shells of this immense basin are analogous, although many particular species may be discovered hereafter in the great western and southern branches of these rivers.

Among the bivalves of the Ohio, the greater portion of the species belong to the genus *Unio*, as now established. A number of species, so great as to quadruple this genus, presenting infinite anomalies in form and structure, is a very remarkable fact, and occasioned doubts respecting the annunciation of its characters. Struck at first by some differences in the animals inhabiting these shells, I thought I could distinguish a new family or a new genus, which I proposed to name *Potamila*. I was afterwards convinced, that notwithstanding the slight differences in the animals, these shells accorded entirely with the generic character of the Unio, but at the same time exhibiting well defined secondary characters, such as, transverse or longitudinal shells, with forms either

elliptical, triangular, square, oboval, rounded, &c. and with the lamellar tooth, either horizontal, oblique, vertical, straight, curved, flexuous, &c. In my Prodromus of seventy new genera, I proposed to divide them into eight sub-genera. Since that, having increased the number of my species, it seemed proper to construct several genera and sub-genera; I however give the name *Unio*, in the *second place*, to all my new species, in conformity with the views of naturalists, who hesitate in adopting the changes in nomenclature which discoveries render necessary; remarking, that by admitting all of them into the genus Unio, which will then consist of more than seventy species, it would be requisite to repeat, in the description of their specific characters, that of the characters of my new genera, which would render the definition of the species prolix.

Of the Unios of North America mentioned by authors, one was discovered by the younger Michaux in the Ohio, and in the account of his travels it is named *U. Ohiensis*, but as it is not described, I cannot refer it to any of my species: besides, the name is unsuitable; it is singular that he found but one in that river, which has produced upwards of fifty species! The Unio *Caroliniana* of Bosc is imperfectly described; however, I presume that it is not identical with any species of the Ohio. Among the new species

of Unios described by SAY, in *Nicholson's Dictionary* (*American edition*) *Art. Conchology*, there are four from the Ohio, viz :—*U. Crassus ; U. Alatus ; U. Ovatus*, and *U. Cylindricus ;* the description of the first one evidently comprises many species, improperly blended.

The other bivalves of the Ohio belong to the genera, *Alasmodon*, *Cyclas*, and *Notrema*,* which comprise very few species.

The animals contained in these shells are scarcely fit for food, the taste being extremely flat and insipid, and consequently but little used for that purpose. Some of the large species, however, have an enticing appearance, but the only mode by which they are rendered fit for the table, consists, in soaking them for a time in vinegar, they may then be fried or soused. Several kinds of fish feed on them, especially the *Ambloclon grunniens*. Herons also devour them, when they cannot procure fish ; and hogs are very fond of them,—herds of these animals are often seen searching for them in the rivers, and are devoured by them with avidity, notwithstanding the hard thick shell of many species. The vulgar names do not vary much, they are all confounded under those of mussel, clam, box-shell, snuff-box, &c.

* Vide supplement.—TRANS.

The interior of many species is adorned with very brilliant colours, such as shades of purple, violet, copper, pearl, gold, and frequently iridescent, although the colour of the epidermis which always covers the shells, is of a dark or black, brown, chestnut, ferruginous, or olive, &c. Many produce pearls or pearly and coloured excrescences, some of which are very beautiful;—their variegated nacre might be made useful and profitable in the arts. In places out of the limestone region, these shells are gathered for the purpose of making lime. The animal is usually white, sometimes yellow or saffron coloured; and is very long lived.

FAMILY PEDEFERIA.

Shell bivalve, equivalve, inequilateral; *animal* having a large compressed *foot*, tendinous, not byssiferous; two very short *syphons*, or sometimes instead, two *apertures;* the *anus* under the ligament; *hinge* dentated or lamellated.

This family includes all the bivalve shells of the Ohio, such as the genera *Unio*, *Anodonta*, &c. of authors; as well as my new genera separated from the Unio. I have divided it into several sub-families, of which five are found in the Ohio.

First sub-family—*Uniodiæ.*

Shell transverse; *cardinal tooth* bilobed, anterior; *lamellar tooth*, posterior, horizontal, or oblique; *apices* or *beaks* slightly oblique; *wrinkles* concentric or zonal.

First Genus—Unio.

Shell elliptical; *ligament* straight; *cardinal tooth* bilobed, commonly furrowed or sulcated; *lamellar tooth* horizontal, often straight, never flexuous; *axis* variable; *marginal contour* usually thickened; three *cicatrices* or *muscular impressions.* Animal with a large bilobed *mantle*, not fringed; *syphons* scarcely protruding; with a flat bilamellar appendage at the side of each syphon; *branchiæ* striated in the form of a second interior and bilobed mantle.

It is thus I define the group, to which I retain the name of Unio, because it appears to be the most numerous, and resembles that known by this name in Europe; nevertheless it seems, that if these shells are identically congeneric, the *lamellar appendages* of the *syphons*, and the striated mantle-like *branchiæ*, would have been noticed. Besides the three *muscular impressions*, many species have a muscular *fossule* or *pit* at the extremity of the *lamellar tooth*, which, though

sometimes confluent with the solitary impression on this side of the shell, is often distinct from it. If this genus differs in the animal, from the Unios of Europe, it must be called *Elliptio*, a name which I have given to one of its sub-genera. I divide it into four sub-genera.

First Sub-genus—Elliptio.

Shell elliptical; *axis* extramedial; *cardinal tooth* furrowed; *contour* thickened; *ligament* corneous; *lamellar tooth* straight.

Species I. *Unio Nigra*—(*Elliptio Nigra.*)

Shell oval-elliptical, slightly ventricose, (*bombée;*) with a slight angular truncation posteriorly; thick; *epidermis* blackish; *nacre* roseate; *lamellar tooth* thick, obtuse, slightly crenulated. Length $\frac{9}{15}$—diam. $\frac{6}{15}$—axis $\frac{2}{5}$ of the breadth.

This is one of the large species produced in the Ohio, sometimes measuring six inches in breadth; *nacre* fine, frequently iridescent, as are always the *muscular impressions; fossule* distinct.

The following description of the form of the *hinge*, applies to all the species. *Cardinal tooth* bilobate, anterior, thick, trihedral, furrowed, lobes of unequal size, the anterior smallest in the right valve, the opposite one in the left; *lamellar tooth*

simple in the right, which fits in the *double* lamellar tooth of the left valve; *ligament* hard, almost calcareous, corneous exteriorly and convex; two unequal *muscular impressions* beneath the cardinal tooth, the *second* or *inferior* smaller than the other; the *fossule* forms a kind of fourth muscular impression between the end of the lamellar tooth and its muscular impression, which is separated from it. *Apices* or *summits* of the valves decorticated, and frequently the shell also; this has been erroneously employed by conchologists as a specific character, as it exists in all the species, except the *U. flava*, *U. viridis*, and young shells. This effect is accidental and secondary, and the consequence of their mode of living. In opening and closing the valves, the animal rubs them against the sand or gravel in which it resides, and thus gradually wears away the apex; if it resides in mud, the parts are very slowly denuded, whilst among gravel the whole surface of the valves becomes worn and carious. The *contour* of the marginal edge, is, on the contrary, quite entire, and hermetically closed by a prolongation of the membranous and flexible *epidermis*, which the animal forms by an exudation from its *foot*. No part of the shell is *gaping*,* except in old specimens. In order to complete the general

* In the original work, the word "*brilliant*" is a misprint for "*baillant*.—Trans.

knowledge of these animals, I subjoin a description of that inhabiting the *U. nigra.*

All the animals belonging to this family present but slight differences in colour, dimensions, and proportions.

Body white or slightly flesh coloured; *mantle* smooth, thin, covering the valves, bilobed and posteriorly notched, rough, without fringes; *second mantle* interior, branchial, striated obliquely, thin, bilobed posteriorly, much smaller than the exterior one, and enveloping the foot; *foot* compressed, muscular, coriaceous, oblong, dilatable; *mouth* anterior; *anus* posterior, at the extremity of the ligament. The anterior lateral *syphons* equal, one on each side, behind the mouth, in the form of a perforated tubercle; and still further back, equally on each side, an *obtuse bilamellar appendage* with unequal plates, flat, oval, or oblong, the interior one largest; these are apparently the organs of generation. From this description, the result of an accurate examination of twenty species and three hundred individuals, it will be perceived, that there is a very remarkable difference between these animals and those of the European Unios, as described by authors, and particularly by Ferrusac, (*vide Essai d'une methode conchyliogique*) who prides himself on the scrupulous exactness with which he has described the fluviatile mollusca.

These animals live on the surface of the beds of rivers; free; and resting in various positions, on the side or vertically, with the aperture below or oblique. They can when necessary bury themselves in the sand or earth, particularly in winter, and even in summer in the smaller rivers subject to be dried up. They resist drought very well. Their progressive motion is very slow, effected by means of their foot, which as slowly furrows the ground. They are hermaphrodite and very prolific, the eggs are very small and enveloped in a glairy substance, frequently of a yellow colour. Many young shells are hatched in the shell of the parent.

This species has two varieties, viz:—

Var. 1. *Fusca*—deep brown epidermis, pale nacre.

Var. 2. *Maculata*—brown spots, nacre almost white.

SPECIES II. *Unio crassa*—(*Elliptio crassa.*)

Syn. Unio crassus. SAY.

Shell elliptical, slightly ventricose, very thick; *epidermis* brown; *nacre* white; *lamellar tooth* thick, obtuse; *wrinkles* distinct. Length $\frac{2}{3}$—diam. $\frac{1}{3}$—axis $\frac{1}{5}$ of the breadth.

This species is figured by Mr. SAY under this

name, but his description (in which from his own admission he blends several species) is worth nothing. The shell is thicker in this, than in the preceding species; otherwise it resembles it very much; the principal difference consists in the *axis* being more lateral, and the want of posterior inclination. Breadth from four to five inches.

SPECIES III. *Unio viridis*—(*Elliptio viridis.*)

Shell elliptical, obliquely truncated posteriorly; slightly ventricose; scarcely thick; *apices* with flexuous wrinkles; *epidermis* smooth, olive green; *nacre* bluish; *cardinal tooth* compressed, crenulated, divergent. Length $\frac{5}{9}$—Diam. $\frac{7}{16}$—axis $\frac{1}{3}$ of the breadth.

Var. 1. *radiata*—radiated with pale yellow.

Var. 2. *fuscata*—epidermis brownish olive.

A small species, at most an inch and an half in breadth, rare in the Ohio, common in the Kentucky and the small rivers adjacent. *Apices* seldom eroded, for they are thickened by flexuous *folds* or *wrinkles*, remarkable because the rest of the exterior is smooth. The *cardinal tooth* is slender, and, in consequence, becomes crenulated instead of being furrowed; *truncation* oblique, convex; *muscular impressions* slight; no fossule; *lamellar tooth* slender.

Species IV. *Unio Fasciata*—(*Elliptio Fasciata.*)

Shell elliptical, ventricose, slightly thick; *epidermis* slightly rugose, olive coloured, ornamented with brown rays; *nacre* bluish; *cardinal tooth* rugose, divaricated; *lamellar tooth* carinated. Length $\frac{2}{3}$—diam. $\frac{1}{2}$—axis $\frac{1}{3}$ of the breadth.

Var. 1. *nigro-fasciata*—dark rays.

Var. 2. *alternata*—greenish with blackish rays; alternately broader and narrower.

Var. 3. *cuprea*—copper coloured, with olive rays; nacre light copper colour.

A handsome species, approaching the U. ochraceus of Say; commonly small; I have seen some specimens, however, more than three inches broad. In the rivers Ohio, Allegheny, Muskingum, Kentucky, Salt, Green, &c. Muscular impressions slight; fossule deep.

Note.—We should probably refer to this sub-genus the following species of authors, and perhaps some others:

Unio *Caroliniana of* Bosc.

plicata? from Lake Erie—Lesueur.

Var. of *U. crassa.** Say.

*purpurea.** Say. Pennsylvania.

aurata, a new species from the Hudson: it is elliptical, with the poste-

* *U. crassus—U. purpureus.* Say.—Trans.

rior part obliquely truncated; *shell* rather thick; *epidermis* brown, blackish, olive and gold coloured; *tooth* small, rugose. Length $\frac{4}{7}$—diam. $\frac{2}{7}$—axis $\frac{1}{4}$ of the breadth.

Unio *pictorum*, &c.

Second Sub-genus—LEPTODEA.

Cardinal tooth entire and smooth, that of the right valve simple; *contour* not thickened; *ligament* membranaceous; *lamellar tooth* slightly curved.

SPECIES V. *Unio leptodon*—(*Elliptio leptodon.*)

Shell elliptical, much compressed, attenuated posteriorly, thin and fragile, somewhat rugose; *epidermis* brownish; *nacre* violaceous; *cardinal tooth* small, obtuse, smooth, tubercular; *lamellar tooth* thin and long. Length $\frac{1}{2}$—diam. $\frac{1}{6}$—axis $\frac{1}{3}$ of the breadth.

Common in the lower part of the Ohio, mostly small, for its shell is so fragile, that it easily becomes the prey of its enemies; notwithstanding this, it sometimes attains to three inches in breadth. The *muscular impressions* are slight; *fossule* apparent, confluent; *animal* whitish.

Var. 1. *olivacea*—olive epidermis.

Var. 2. *semi-radiata*, olive with half rays, brown.

Species VI. *Unio fragilis*—(*Elliptio fragilis.*)

Shell elliptical, a little dilated posteriorly, very thin and fragile, almost smooth ; *epidermis* olive ; *nacre* bluish ; *cardinal tooth* smooth, compressed ; *lamellar tooth* short. Length $\frac{2}{3}$—diam. $\frac{1}{3}$—axis $\frac{1}{3}$ of the breadth.

Var. 1. *fuscata*—epidermis reddish brown.

This species resembles the preceding very much ; differing from it however in shape, which is dilated instead of being attenuated, slightly compressed ; ventricose, surface almost smooth, &c. The *apices* not apparent ; *animal* yellowish ; breadth about two inches. These two species nearly resemble the *U. viridis*, *U. fasciata*, *U. aurata*, *U. nasuta*, &c. which are also fragile, but may readily be distinguished by their *teeth*, which are very different, being smooth ; *lamellar tooth* somewhat curved, &c.

Species VII. *Unio nervosa*—(*Elliptio nervosa.*)

Shell elliptical, widest posteriorly, thin, with flexuous nerve-like lines, concentric, vermicular ;

border undulated ; *epidermis* brown ; *nacre* bluish. Length $\frac{2}{3}$—diam. $\frac{2}{5}$—axis $\frac{1}{3}$ of the breadth.

This species is rare and very distinct ; I have found it at the rapids of the Ohio; breadth one inch and an half. The *cardinal tooth* small and tubercular ; *lamellar tooth* narrow and curved ; *muscular impressions* slightly apparent ; *marginal contour* somewhat thickened, undulated, and eroded.

Third Sub-genus—Aximedia.

Lamellar tooth slightly curved ; ***axis*** nearly medial ; ***valves*** almost equilateral.

Species VIII. *Unio elliptica*—(*Elliptio elliptica.*)

Shell elliptical, angular posteriorly, thick, almost smooth ; *epidermis* chestnut brown ; *nacre* pale violaceous ; *cardinal tooth* wrinkled, obtuse ; *lamellar tooth* obtuse, thick. Length $\frac{3}{4}$—diam. $\frac{3}{8}$—axis $\frac{7}{16}$ of the breadth.

This shell is also rare, found near Louisville and Maysville, K. Breadth about two inches ; *muscular impressions* deep ; *valves* slightly ventricose ; *apices* prominent, very obtuse.

Species IX. *Unio lævigata*—(*Elliptio lævigata.*)

Shell elliptical, rounded, ventricose, thick, smooth; *epidermis* olive; *nacre* bluish white; *cardinal tooth* slightly wrinkled; *lamellar tooth* short. Length $\frac{5}{7}$—diam. $\frac{4}{7}$—axis $\frac{7}{16}$ of the breadth.

A small species, at most an inch in breadth; it approaches the genera *Rotundaria* and *Cyclas.* Found in the Kentucky river. *Apices* rounded, prominent, and eroded; *lamellar tooth* somewhat oblique. This species ought perhaps to belong to the sub-genus *Plagiola*, of the genus *Obliquaria.*

Species X. *Unio zonalis*—(*Elliptio zonalis.*)

Shell elliptical, thick, wrinkled; *epidermis* reddish with brown zones; *apices* prominent, ventricose. Length $\frac{3}{5}$—diam. $\frac{2}{5}$—axis $\frac{2}{5}$ of the breadth.

This species is rare, found but one specimen at the falls of the Ohio; breadth upwards of two inches.

Fourth Sub-genus—Eurinea.

Valves very transversal or broad; *axis* almost lateral; *ligament* very long.

Species XI. *Unio dilatata*—(*Elliptio dilatata.*)

Shell elliptical, oblong, slightly attenuated posteriorly, thick, almost smooth; *epidermis* reddish brown; *nacre* violet; *cardinal tooth* obtuse, thick; *lamellar tooth* very slightly inclined. Length $\frac{1}{2}$—diam. $\frac{2}{7}$—axis $\frac{1}{4}$ of the breadth.

A handsome species, very common; *nacre* beautiful, often changeable purple or bluish, more or less deep or pale; breadth three to four inches; *epidermis* varies red or brown; *muscular impressions* striated; fossule apparent; *cardinal tooth* thick, rugose; *lamellar tooth* obtuse; animal yellowish.

Species XII. *Unio latissima*–(*Elliptio latissima.*)

Shell elliptical-oblong, slightly attenuated posteriorly, thick, smooth; *epidermis* blackish; *nacre* flesh coloured, with a white margin; *cardinal tooth* obtuse, wrinkled; *lamellar tooth* carinated, very straight and long. Length $\frac{2}{5}$—diam. $\frac{1}{4}$—axis $\frac{1}{4}$ of the breadth.

A large species, attaining eight inches in breadth; not so common as the preceding; *cardinal tooth* somewhat trihedral; *muscular impressions* smooth; *fossule* slightly marked; *lamellar tooth* carinated, sharp, thick, horizontal;

animal white. A similar species is found in the river Susquehanna.

Species XIII. *Unio solenoides*—(*Elliptio solenoides.*)

Shell elliptical, cylindrical, attenuated, rounded anteriorly; retuse posteriorly; thick, very ventricose, with flexuous posterior *wrinkles; epidermis* olive brown; *nacre* bluish white; *cardinal tooth* rugose, obtuse; *lamellar tooth* very long, horizontal. Length $\frac{3}{7}$—diam. $\frac{4}{11}$—axis $\frac{3}{11}$ of the breadth.

A very remarkable species, found in the upper part of the Ohio. Breadth about three inches; *apices* prominent; *fossule* visible.

Var. 1. *interrupta*, with some blackish lines interrupted or broken anteriorly.

Var. 2. *nodosa*—with knots or nodosities posteriorly.

Var. 3. *cylindricus*, Say. Very thick, *nacre* white, *apices* very large.

Second Genus—Lampsilis.

Shell oval; *ligament* curved, *cardinal tooth* furrowed; *lamellar tooth* curved, flexuous; *axis* extramedial; *marginal contour* thickened; three

muscular impressions ; animal similar to that of the Unio, but with syphons apparent, short.

This name is modified from *Lasmacampsilis*, which signifies flexuolated *lamellar tooth*, the essential character of this genus.

Species XIV. *Lampsilis cardium*—(*Unio cardium.*)

Shell oval, broad, inclined posteriorly, very ventricose, thick; *apices* prominent, heart shaped ; *epidermis* reddish brown, rugose, blackish posteriorly ; *nacre* white, roseate posteriorly. Length $\frac{3}{4}$—diam. $\frac{2}{5}$—axis $\frac{1}{3}$ of the breadth.

A beautiful species, very ventricose ; breadth sometimes six inches ; *cardinal tooth* striated, crenulated; *lamellar tooth* compressed; *animal* white, *bi-lamellar appendages* broad, exterior *lamellar tooth* largest.

Species XV. *Lampsilis ovata*—(*Unio Ovata.*) *Unio ovatus*, Say.

Shell oval, regular, attenuated posteriorly, ventricose; *apices* prominent; *epidermis* corneous, brown on the posterior depression ; *nacre* white ; somewhat thick. Length $\frac{3}{4}$—diam. $\frac{3}{10}$—axis $\frac{1}{3}$ of the breadth.

May not this be a variety of the preceding species? It seems to differ principally in shape, being less ventricose, and less dilated posteriorly.

Species XVI. *Lampsilis fasciola*—(*Unio fasciola.*)

Shell oval, dilated posteriorly, ventricose, somewhat thick; *epidermis* olivaceous with bands, radiated, flexuous, unequal, greenish. Length $\frac{2}{3}$—diam. $\frac{2}{5}$—axis $\frac{1}{3}$ of the breadth; *nacre* bluish white.

Rare; found in the Kentucky; breadth two to three inches; *cardinal tooth* small, superior part furrowed, smooth and inclining inferiorly; *lamellar tooth* slender, plaited.*

* The two following species, which I discovered in the Hudson river, ought to belong to this genus.

Lampsilis rosea. Oval, dilated and truncated obliquely, posteriorly; *shell* thick, wrinkled; *epidermis* olivaceous; black posteriorly; *nacre* roseate; very ventricose; *apices* prominent. Length 5-8—diam. 1-2—axis 4-5 of the breadth.

Lampsilis pallida. Oval, dilated and rounded posteriorly; *shell* thick, *wrinkles* separated; *epidermis* reddish olive with brown rays; oblique posteriorly; *nacre* white. Length 3-4—diam. 1-2—axis 4-5 of the breadth.

Third Genus—METAPTERA.

Shell oval, triangular, dilated into a *wing* posteriorly; *ligament* inclined over the wing; *cardinal tooth* bilobed, crenulated; *lamellar tooth* curved, detached from the edge of the wing; *axis* extramedial; *contour* slightly thickened; three *muscular impressions; animal* resembles that of the *Unio.*

The name signifies *posterior wing;* I at first adopted that of Proptera, erroneously, because it signifies anterior wing.

SPECIES XVII. *Metaptera megaptera*—(*Unio megaptera.*)

Shell thin, compressed; *epidermis* brown, flexuously rugose; *nacre* purple; *wing* very large, smooth inside; *lamellar tooth* double in the right valve, and with an oblong protuberance at the extremity. Length $\frac{2}{3}$—diam. $\frac{2}{9}$—axis $\frac{1}{4}$ of the breadth.

A fine species, common in the Ohio; beautiful *nacre*, purple, iridescent; frequently with pearliform tubercles; *cardinal tooth*, lobes nearly equal in size, smooth exteriorly; crenulated, compressed, furrowed interiorly; *anterior muscular impressions* strongly marked, striated; the

posterior one almost effaced. Breadth sometimes six inches.

The *U. alatus* of Say, which is found in Lake Erie, appears to resemble this species, and to differ from it only in its *wing*, which is rugose inside; *contour* marked, flexuous; *lamellar tooth* simple in the right valve; length four fifths of the breadth, &c. It appears that the two following species of Say, should also be referred to this genus, but he does not point out the *lamellar tooth* as being flexuous.

U. ochraceus.

U. cariosus.

Fourth Genus—Truncilla.

Shell semi-triangular, *axis* nearly medial; *ligament* oblique; the *truncation* plane, oblique, posterior; *cardinal tooth* smooth, denticulated, compressed; *lamellar tooth* compressed, oblique; *animal* similar to that of the Unio.

This name is derived from the remarkably oblique truncation, which is more distinctly marked than in all the other species of this family.

SPECIES XVIII. *Truncilla triqueter*—(*Unio triqueter.*)

Shell slightly thick, very ventricose; *apices* prominent; *shape* almost trihedral; *posterior part* very flat, a little tessellated, ventricose; *epidermis* of a deep olive colour striped with brown anteriorly; *borders* and *wrinkles* flexuous in the middle; *nacre* bluish white. Length $\frac{2}{3}$—diam. $\frac{1}{2}$—axis $\frac{2}{5}$ of the breadth.

A species very remarkable and rare, which I have observed only at the falls of the Ohio; its form is so singular, that it has received the vulgar name of snuff box; I have not seen the animal, which I suspect differs somewhat from that of the Unio; breadth one and an half inches, *lamellar tooth* short, broad, and obtuse; *muscular impressions* slightly marked, the posterior one very large, occupying nearly all that portion of the face of the valves; *fossule* very slight; *edge* or *border* slightly flexuous.

SPECIES XIX. *Truncilla truncata*—(*Unio truncata.*)

Shell slightly thick, somewhat ventricose, slightly square; *apices* prominent; the *posterior face* truncated; *epidermis* olive; *edge* and *wrinkles* flexuous posteriorly; *nacre* bluish white.

Length $\frac{4}{7}$—diam. $\frac{8}{15}$—axis $\frac{5}{12}$ of the breadth. This species is more common than the preceding, and smaller, usually one inch in breadth; *teeth* broad; *edge* sharp.

Var. 1. *fusca*, almost entirely brown.

Var. 2. *vermiculata*, with flexuous brown transverse lines.

Fifth Genus—Obliquaria.

Form variable, often somewhat transverse, and more or less oblique posteriorly; *ligament* oblique; *cardinal tooth* bilobed, commonly furrowed; *lamellar tooth* oblique, often straight; *axis* variable; *marginal contour* thickened; three *muscular impressions; animal* similar to that of the *Unio*.

This group is numerous in species; it differs principally from the *Unio* or *Elliptio* in its form, by the *ligament* and by the oblique *lamellar tooth*, &c. It presents many anomalies, and secondary characters, which oblige me to divide it into six sub-genera.

First Sub-genus—Plagiola.

Axis extramedial; *lamellar tooth* curved; *ligament* curved; *form* of the shell variable, but not oblique.

SPECIES XX. *Obliquaria decorticata*—(*Unio decorticata.*)

Shell rounded-elliptical, thick and very ventricose; *apices* prominent; *epidermis* blackish, nearly detached; *wrinkles* separated; *nacre* white. Length $\frac{3}{4}$—diam. $\frac{1}{3}$—axis about $\frac{1}{3}$ of the breadth.

I have observed this species in the museum of Mr. J. D. Clifford, at Lexington, Ky.; it inhabits the Mississippi, and apparently the lower part of the Ohio. In form it resembles the *Lampsilis;* but its *lamellar tooth*, instead of being flexuous, is curved into an oblique and short arch. Although the *animal* was living, almost all the *epidermis* was destroyed, even to the white *nacre;* and there was perceptible at the *apices*, intermediary, smooth, shining and olivaceous nacre. The *wrinkles* deep and separated; a slight oblique *slope* posteriorly; *cardinal tooth* very much furrowed; *muscular impressions* very deep; *fossule* confluent; breadth upwards of four inches.

SPECIES XXI. *Obliquaria interrupta*—(*Unio interrupta.*)

Shell oval-elliptical, somewhat thick, and slightly ventricose; *epidermis* reddish brown, slightly

wrinkled, with some transversal blackish, interrupted bands; *nacre* bluish white. Length $\frac{5}{8}$—diam. $\frac{1}{3}$—axis $\frac{3}{8}$ of the breadth.

Found in the Kentucky and Ohio; breadth about two inches; *fossule* visible; *lamellar tooth* slightly rugose, thick, carinated; *apices* not prominent.

Species XXII. *Obliquaria depressa*—(*Unio depressa.*)

Shell oval-triangular, thick and much depressed; *epidermis* wrinkled, olive-brown, with oblique linear scattered black points; *nacre* bluish; somewhat truncated posteriorly. Length $\frac{2}{3}$—diam. $\frac{2}{9}$—axis $\frac{1}{3}$ of the breadth.

This species is very rare. I have seen only one at Evamville, (Ind.) and deposited the only specimen I possessed in the museum of Mr. J. D. Clifford of Lexington, (Ky.) with my other species. This shell is almost flat; breadth one and an half inch; *fossule* visible; teeth striated; the *lamellar tooth* carinated and sharp; it resembles the sub-genus *Scalenaria.*

Species XXIII. *Obliquaria lineolata*—(*Unio lineolata.*)

Shell nearly round, thick, slightly ventricose, somewhat truncated posteriorly; *epidermis* reddish, slightly wrinkled, with brown lines; *nacre* white. Length $\frac{4}{5}$—diam. $\frac{1}{2}$—axis $\frac{1}{3}$ of the breadth. *Apices* somewhat prominent.

Found at the falls of the Ohio; breadth about two inches; *posterior portion* truncated, plane, narrow; *muscular impressions* deep rugose; *lamellar tooth* short, thick, carinated, rugose, almost straight.

Second Sub-genus—Ellipsaria.

Axis extramedial; *lamellar tooth* straight; *ligament* straight; *shell* elliptical.

Species XXIV. *Obliquaria ellipsoria*—(*Unio ellipsaria.*)

Shell elliptical, with a posterior diagonal angle; *epidermis* somewhat wrinkled, reddish olive; *nacre* white; *axis* almost lateral. Length $\frac{3}{4}$—diam. $\frac{3}{8}$—axis $\frac{1}{5}$ of the breadth.

Var. 1.—*fusca* entirely brown; breadth about five inches; no fossule; found in

the Kentucky; resembles the genus Amblema; ligament horizontal.

Species XXV. *Obliquaria fasciolaris* (*Unio fasciolaris.*)

Shell thick, convex, oval-elliptical, posteriorly attenuated; *epidermis* reddish, almost smooth, with oblique brown bands; *nacre* white. Length $\frac{2}{3}$—axis $\frac{1}{4}$ of the breadth.

Var. 1. *interrupta*—bands interrupted.

Var. 2. *fuscata*—almost entirely brown, bands black.

Var. 3. *obliterata*—bands almost effaced; shell very thick.

Var. 4. *longa*—length $\frac{3}{4}$ of the breadth.

This species is common in the Ohio, Kentucky, Wabash, &c. and appears intermediate between the *U. interrupta* (species 21) and the *Unio nasutus* of Say. The *animal* white, similar to that of the Elliptio. A remarkable character of this species consists in the *cavity* of the valves, which has some oblique *wrinkles*. *Ligament* somewhat oblique; *apices* thick, but not prominent; *cardinal tooth* wrinkled, thick; *lamellar tooth* thick, short; *fossule* visible; *muscular impressions* deep. Breadth sometimes five inches.

Species XXVI. *Obliquaria verrucosa*—(*Unio verrucosa.*)

Shell somewhat thick, elliptical; obliquely sloped posteriorly, with verrucose wrinkles; *epidermis* reddish brown; *nacre* white. Length $\frac{2}{3}$—axis $\frac{1}{3}$ of the breadth.

This species is remarkable for several concentric ranges of unequal warts, flattened, often white by rubbing; found in the Ohio; breadth three inches; *cardinal tooth* one lobe very large, wrinkled, the other small and smooth; *muscular impressions* deep and smooth; *lamellar tooth* obtuse; *ligament* horizontal.

Species XXVII. *Obliquaria cuprea*—(*Unio cuprea.*)

Shell thick, elliptical, obliquely sloped posteriorly; *epidermis* black, almost smooth; *nacre* copper coloured. Length $\frac{3}{5}$—diam. $\frac{5}{8}$—axis $\frac{1}{3}$ of its breadth.

A very handsome species; two inches in breadth; *nacre* singular, brownish flesh inclining to copper colour, changeable to purple. I found this species in the Monongahela and Potomac;

lamellar tooth short; no fossule; *cardinal tooth* somewhat wrinkled; *ligament* horizontal.*

Third Sub-genus—QUADRULA.

Form square, but anteriorly rounded, slightly transversal.

SPECIES XXVIII. *Obliquaria flava*—(*Unio flava.*)

Shell somewhat thick, convex, and sloping posteriorly; *apices* slightly prominent, entire, rugose; *epidermis* nearly smooth, yellowish brown; *nacre* flesh coloured. Length $\frac{5}{7}$—diam. $\frac{2}{7}$—axis $\frac{2}{7}$ of the breadth.

A fine species, found only in the small rivers falling into the Kentucky, Salt, or Green rivers.

* The *Unio nasutus* of SAY, ought to belong to this sub-genus; and the following species, which I observed in the river Hudson, resembles it much: may not this be a variety?

Obliquaria attenuata,—elliptical, dilated, attenuated, with a posterior slope; *ligament* horizontal; *epidermis* rugose, dark brown; *nacre* pale rose colour. Length 1-2—diam. 1-4—axis 1-4 of the breadth. Breadth four inches.

Breadth from two to four inches. Animal of a deep or orange yellow colour, with a large circular *foot*; in other respects it resembles *Ellipta*. *Shell* almost yellow when young; the *lamellar tooth* carinated, thin; *cardinal tooth* striated over the whole surface; *ligament* oblique, resembles the *unio lineolata*, which perhaps ought to be placed here.

Species XXIX. *Obliquaria Cyphia*—(*Unio Cyphia.*)

Shell thick, ventricose, hunched; *edge* flexuous, sloping posteriorly; *epidermis* chestnut brown; *tubercles* with flexuous wrinkles; *nacre* white. Length $\frac{8}{9}$—diam. $\frac{5}{9}$—axis $\frac{5}{9}$ of the breadth. Breadth two to three inches.

Shell thickest anteriorly, with large *wrinkles*, and some oblong *tubercles;* a large oblique longitudinal *hunch*, or boss; *cardinal tooth* thick, striated; found at the falls of the Ohio.

Species XXX. *Oliquaria metanevra*—(*Unio metanevra.*)

Shell thick, ventricose, hunched, with two marginal *sinuses;* one posterior and the other

terminal; sloped and nerved posteriorly; *epidermis* wrinkled, brownish with dark spots; *nacre* flesh coloured. Length $\frac{4}{5}$—diam. $\frac{7}{10}$—axis $\frac{4}{10}$ of the breadth.

A small and rare species; scarcely more than an inch in breadth; found in the Kentucky; *shell* thin posteriorly; *nerves* obliquely curved on the dilated posterior *edge*; one or two *hunches* on the *oblique elevation*; *lamellar tooth* short, and broad; *cardinal tooth* striated; no fossule.

Species XXXI. *Obliquaria reflexa*—(*Unio reflexa.*)

Shell thick, convex, hunched, almost rounded, truncated posteriorly; inferior *edge* reflected, having a posterior sinus; *epidermis* reddish, almost smooth, rugose posteriorly; *nacre* white, iridescent. Length $\frac{5}{6}$—diam. $\frac{2}{3}$—axis $\frac{5}{12}$ of the breadth. Breadth one and an half inches.

Attenuated posteriorly; *two hunches* on the medial elevation; its end reflected; *wrinkles* separated, flexuous in the form of *sutures*; *lamellar tooth* prolonged, carinated, very slightly curved; *cardinal tooth* very much striated; *fossule* visible. Found in the Kentucky and at Letart's rapids: may not this species belong to the sub-genus *Rotundaria?*

Species XXXII. *Obliquaria retusa*—(*Unio retusa.*)

Shell thick, convex, without elevations, with a slight terminal *sinus; epidermis* olivaceous, with slight *wrinkles*, distant; *nacre* whitish. Length $\frac{7}{8}$—diam. $\frac{3}{8}$—axis $\frac{1}{3}$ of the breadth.

A small species, one or two inches broad; rare; found in the Ohio and Kentucky; *lamellar tooth* short, carinated; *fossule* not visible.

Species XXXIII. *Obliquaria flexuosa*—(*Unio flexuosa.*

Shell thick, with two slight elevations and a broad flat *depression* between them; sloped posteriorly; *epidermis* yellowish brown, lined with brown at the *base*, with flexuous wrinkles, somewhat striated; *edge* flexuous; *nacre* bluish. Length $\frac{6}{7}$—diam. $\frac{3}{7}$—axis $\frac{3}{7}$ of the breadth.

Found in the Kentucky, Salt and Green rivers —breadth about two inches; *lamellar tooth* short, almost doubled in the right valve; *fossule* visible; *cardinal tooth* small, striated; *muscular impressions* deep.

Var. 1. *bullata*, with some broad tubercles, flat and transversal on the elevations.

SPECIES XXXIV. *Obliquaria nodulata*—(*Unio nodulata.*)

Shell thick, ventricose, *nodulated*, sloped posteriorly, and truncated vertically; linear longitudinal *tubercles* upon the posterior dilatation; *epidermis* almost smooth, reddish brown; *nacre* iridescent. Length $\frac{11}{12}$—diam. $\frac{2}{3}$—axis $\frac{1}{3}$ of the breadth. Breadth one inch and an half.

Found in the Kentucky, four separate nodosities distant; *cardinal tooth* thick, striated; *muscular impressions* deep; *lamellar tooth* carinated. It resembles the *obliquaria retusa;* both have the *lamellar tooth* very slightly curved.

SPECIES XXXV. *Obliquaria quadrula*—(*Unio quadrula.*)

Shell very thick, somewhat ventricose, with an oblique longitudinal *elevation;* oblique *furrow* and *sinus* posteriorly; *epidermis* brown, wrinkled; *wrinkles* striated and tuberculated anteriorly; *nacre* white, roseate on the *borders.* Length $\frac{6}{7}$—diam. $\frac{4}{7}$—axis $\frac{1}{4}$ of the breadth. Breadth two to three inches.

Common in the Ohio; with some oblong transversal *tubercles* on the elevation; shell somewhat sinuous on the disk; *lamellar tooth* short, thick,

carinated, striated; *fossule* confluent; *cardinal tooth* large, striated; *apices* truncated.

Species XXXVI. *Obliquaria bullata*—(*Unio bullata.*)

Shell thick, convex, slightly ventricose, with an oblique *furrow* and *sinus* posteriorly; strewed with irregular confluent *tubercles; epidermis* reddish brown with flexuous *wrinkles* distant; *nacre* white, flesh coloured. Length $\frac{11}{12}$—diam. $\frac{2}{3}$—axis $\frac{1}{3}$ of the breadth.

Found at the falls of Ohio; rare; breadth almost two inches; *cardinal and lamellar teeth* like preceding species; *apices* rounded, decorticated, but not truncated; *tubercles* often bleached and worn, flattened, pustulated, of various forms.

Fourth Sub-Genus—Rotundaria.

Shell rounded, scarcely transversal, almost equilateral; *axis* almost medial; *ligament* curved, short, corneous; *lamellar tooth* slightly curved; *cardinal tooth* somewhat anterior.

Species XXXVII. *Obliquaria tuberculata*—(*Unio tuberculata.*)

Shell very thick, ventricose, slightly truncated posteriorly; strewed with unequal *tubercles*, except anteriorly; *epidermis* wrinkled, chestnut brown; *nacre* violaceous. Length $\frac{10}{11}$—diam. $\frac{6}{11}$—axis $\frac{5}{11}$ of the breadth.

A species common in the Ohio and adjacent rivers; breadth three inches at most; *animal* yellowish; *cardinal tooth* thick; very rugose; *lamellar tooth* short, carinated; *fossule* confluent; *muscular impressions* deep; *nacre* varies from bluish to deep purple.

Species XXXVIII. *Obliquaria Subrotunda*—(*Unio subrotunda.*)

Shell thick, ventricose, convex, perfectly rounded; *epidermis* almost smooth, yellowish brown; *nacre* bluish white. Length almost equal to the breadth;—diam. $\frac{3}{4}$—axis $\frac{7}{16}$ of the breadth.

Var. 1. *maculata*, strewed with dark spots.

This species is common in the Ohio and its tributaries; remarkable by its almost equilateral and not transversal *form; apices* prominent, rounded; *cardinal tooth* thick furrowed; *lamellar tooth* carinated, short, and somewhat punc-

tured; *fossule* confluent; anterior *muscular impression* punctured.

Species XXXIX. *Obliquaria pusilla*—(*Unio pusilla.*)

Shell thick, convex, perfectly rounded; *epidermis* smooth, blackish; *nacre* white. Length $\frac{6}{7}$—diam. $\frac{2}{7}$—axis $\frac{3}{7}$ of the breadth.

This species is very rare; found in the lower part of the Ohio; breadth scarcely more than half an inch; resembles in shape and appearance the *Cyclas; cardinal tooth* almost smooth; *lamellar tooth* linear. May this not be a young individual?

Fifth Sub-Genus—Scalenaria.

Form obliquely triangular, scarcely transversal, but very inequilateral; *axis* almost lateral; *cardinal tooth* scarcely anterior; *lamellar tooth* straight; *ligament* oblique.

SPECIES XL. *Obliquaria obliquata*—(*Unio obliquata.*)

Shell very thick, ventricose; triangularly oval; the three sides *arcuated;* a slight oblique longitudinal *depression; epidermis* almost smooth, black; *nacre* purple rose colour. Length $\frac{9}{10}$—diam. $\frac{6}{10}$—axis $\frac{2}{10}$ of the breadth.

A pretty species; having a fine purple nacre with iridescent changes; found in the Kentucky river; breadth two to three inches; *lamellar tooth* long, carinated; *fossule* large, distinct; *cardinal tooth* wrinkled; *muscular impressions* deep; *apices* prominent, truncated.

SPECIES XLI. *Obliquaria triangularis* (*Unio triangularis.*)

Shell very thick, ventricose, triangular; *posterior face* straight; *apices* prominent; no longitudinal *depression; epidermis* brown, almost smooth; *nacre* roseate white. Length $\frac{3}{4}$—diam. $\frac{1}{2}$—axis $\frac{1}{6}$ of the breadth.

Var. 1. *nigrescens*—epidermis blackish; nacre white.

Common in the Ohio; *breadth* sometimes four inches; *cardinal tooth* very large, furrowed;

lamellar tooth thick carinated; *muscular impressions* and *fossule* deep.

Species XLII. *Obliquaria scalenia* (*Unio scalenia.*)

Shell thick, ventricose, triangular; *sides* almost straight, especially the posterior, which is truncated; *angles* rounded; no depression; *epidermis* smooth, reddish brown, with some oblique longitudinal brown lines; *nacre* white. Length $\frac{7}{9}$—diam. $\frac{5}{9}$—axis $\frac{1}{5}$ of the breadth.

Found in the Kentucky, &c.; *breadth* about two inches; *cardinal and lamellar teeth* furrowed, confluent; *lines* narrow, radiated, distant.

Sixth Sub-genus—Sintoxia.

Shell oblique-oval; *lamellar tooth* and *ligament* curved.

Species XLIII. *Obliquaria lateralis*—(*Unio lateralis.*)

Shell thick, ventricose, oblique-oval; with a slight *depression*, oblique longitudinal, curved,

narrow; *epidermis* wrinkled, brown; *nacre* white. Length $\frac{4}{5}$—diam. $\frac{3}{5}$—axis $\frac{1}{5}$ of the breadth.

Breadth two to three inches. *Cardinal tooth* large, striated; *fossules* visible; *lamellar tooth* thick, carinated, somewhat doubled in both valves.

Species XLIV. *Obliquaria sintoxia* (*Unio sintoxia.*)

Shell thick, ventricose, oblique-oval, without depression; *epidermis* black, almost smooth; *nacre* roseate. Length $\frac{9}{10}$—diam. $\frac{6}{10}$—axis $\frac{2}{5}$ of the breadth.

Found in the Ohio, rare;—*breadth* two to three inches; nearly approaching the *Obovaria pachostea*, *Obliquaria obliquata*, and *Obliquaria triangularis; teeth* like the latter species; by its form, makes the transition to the genus *Obovaria*, which follows.

Second sub-family—*Amblemidia.*

Shell longitudinal; *cardinal tooth* under the apex; *lamellar tooth* inferior vertical; *axis* terminal; wrinkles zonal.

Sixth Genus—Obovaria.

Shell oboval, almost equilateral ; *axis* nearly medial ; *ligament* curved ; *cardinal tooth* striated; *lamellar tooth* almost vertical, slightly curved ; *marginal contour* thickened ; three *muscular impressions ; animal* similar to that of the *Unio*, but having the anus below.

Species XLV. *Obovaria obovalis*—(*Unio obovalis.*)

Shell thick, ventricose, rounded inferiorly ; *apices* prominent ; *epidermis* yellowish brown, wrinkled ; *nacre* white. Inferior breadth $\frac{8}{9}$—diam. $\frac{2}{3}$ of the length—axis medial.

Common in the Ohio and adjacent rivers. *Length* from two to three inches ; *cardinal tooth* broad, thick, rugose ; *lamellar tooth* carinated, somewhat oblique : *muscular impressions* deep.

Species XLVI. *Obovaria torsa*—(*Unio torsa.*)

Shell very thick, ventricose, rounded inferiorly ; *epidermis* brownish ; *nacre* purple ; medial breadth $\frac{6}{7}$—diam. $\frac{3}{7}$ of the length—axis medial.

Var. *marginata* — nacre bordered, white.

Species rarely found in the Ohio, but more abundantly in the small rivers. *Length* from one to two inches; remarkable by its *apices*, which are turned in front, and large *wrinkles*, which are often divided in two by a *furrow; cardinal tooth* wrinkled; *fossule* visible; *lamellar tooth* wrinkled, somewhat oblique, almost double even in the right valve.

Species XLVII. *Obovaria striata*—(*Unio striata.*)

Shell thick, ventricose, rounded inferiorly; with striated *wrinkles*; *apices* scarcely prominent; *epidermis* brown; *nacre* white; medial breadth $\frac{10}{11}$—diam. $\frac{6}{11}$ of the length—axis $\frac{2}{5}$ of the breadth.

Var. 1. *tuberculata*—some striated tubercles on the wrinkles.

Var. 2. *rosea*—epidermis reddish brown, brown anteriorly, nacre roseate.

Length about three inches; found in the upper part of the Ohio. *Animal* yellow; *lamellar tooth* almost vertical, thick; *cardinal tooth* furrowed; *fossule* visible.

SPECIES XLVIII. *Obovaria pachostea*—(*Unio pachostea.*)

Shell extremely thick, ventricose, rounded and attenuated or flexuous inferiorly; *apices* somewhat prominent; *epidermis* brown, slightly wrinkled; *nacre* pale violet colour; *border* flexuous. Medial breadth $\frac{9}{10}$—diam. $\frac{7}{12}$ of the length; oblique axis $\frac{2}{5}$ of the breadth.

A remarkable species, with an interior cavity, very small and wrinkled; broad *cavity* under the tooth; this species approaches the sub-genus *Sintoxia*, genus *Obliquaria*, its *axis* being somewhat oblique, or having a slight *posterior dilatation.* Found in the Kentucky. Length three to four inches; *lamellar tooth* short, vertical, obtuse; *cardinal tooth* very large and broad, furrowed; *fossule* visible.

SPECIES XLIX. *Obovaria stegaria*—(*Unio stegaria.*)

Shell thick, ventricose, rounded inferiorly, slightly imbricated, by the large separated *wrinkles*; *apices* slightly prominent; *epidermis* brown; *nacre* white; inferior breadth $\frac{12}{13}$ of the length, diam. $\frac{2}{3}$ of the breadth; axis medial.

Var. 1. *tuberculata*—with some scattered tubercles.

Var. 2. *fasciolata*—fasciolated with greenish brown; nacre roseate.

A pretty species, rarely longer than one inch; *lamellar tooth* somewhat oblique, straight, obtuse; *cardinal tooth* striated; *fossule* visible; rare in the Ohio.

SPECIES L. *Obovaria cordata*—(*Unio cordata.*)

Shell thick, ventricose, cordated inferiorly by a *sinus* and a slight *depression*; *epidermis* smooth, brown; *nacre* white; *apices* somewhat prominent; inferior breadth $\frac{11}{12}$ —diam. $\frac{2}{3}$ of the length. Axis medial.

Var. *rosea*—epidermis blackish, nacre roseate.

A small handsome species, about an inch long; found in the Ohio, &c.; rare; *lamellar tooth* sharp, doubled, slightly oblique, straight; *cardinal tooth* furrowed; resembles the *Obliquaria retusa*.

Seventh Genus—PLEUROBEMA.

Shell oblong, very inequilateral; *ligament*

straight, or rather unilateral; *axis* quite lateral or posterior; *lamellar tooth* vertical; *cardinal tooth* slightly wrinkled, under the *apex* which is superior, terminal; four *muscular impressions; animal* similar to that of the Unio, except *anus* and *syphons*, which are inferior.

Species LI. *Pleurobema mytiloides*—(*Unio mytiloides.*)

Shell thick, and ventricose superiorly, attenuated at both ends; *apices* prominent, entire; *epidermis* almost smooth, reddish brown, with some oblique black longitudinal bands; *nacre* bluish; *lamellar tooth* narrow; breadth $\frac{3}{5}$—diam. $\frac{1}{2}$ of the length—axis $\frac{1}{6}$ of the breadth.

This species rare; found in the Wabash; length two inches; *apices* somewhat angular, very prominent, entire, heart-shaped; *lamellar tooth* very straight; *muscular impressions* and *fossule* deep.

Species LII. *Pleurobema cuneata*—(*Unio cuneata.*)

Shell thick, ventricose superiorly, oblong-oval, attenuated, wedge-shape inferiorly, rounded su-

periorly; *epidermis* almost smooth, brown; *apices* prominent, truncated; *nacre* white, iridescent; *lamellar tooth* scarcely straight; breadth $\frac{5}{7}$ —diam. $\frac{1}{2}$ of the length—axis $\frac{1}{6}$ of the breadth.

Var. 1. *maculata*—with some square black spots, scattered.

Var. 2. *sulcata*—with a slight longitudinal depression.

Common in the Ohio, near Steubenville, Marietta, &c.; length one to three inches; it chiefly differs from the preceding species in its *form*, its *lamellar tooth* somewhat curved, &c.; *animal* pale yellow; *muscular impressions* profound; the *fossule* forms a fourth impression, which is strongly marked.

Eighth Genus—Amblema.

Shell oval, elliptical or square, very inequilateral; *axis* lateral, posterior; *apex* lateral, oblique, almost superior; *ligament* straight; *lamellar tooth* vertical; *cardinal tooth* wrinkled, lateral at the *apex;* three *muscular impressions*. *Animal* similar to the *Pleurobema*.

Species LIII. *Amblema olivaria*—(*Unio olivaria.*)

Shell thick, somewhat ventricose, oval, elliptical; *apices* scarcely prominent, almost superior; *epidermis* wrinkled, olive-coloured; *nacre* white, iridescent; *lamellar tooth* straight; breadth $\frac{2}{3}$—diam. $\frac{4}{9}$—axis $\frac{1}{2\,0}$ of the length.

Var. 1. *dilatata*—with base dilated superiorly.

Var. 2. *fasciolaris*—with radiated bands, brown.

Found in the Kentucky; length from two to three inches; this species is intermediate between this genus and the preceding genus. *Fossule* visible; *cardinal tooth* slightly wrinkled; *lamellar tooth* thick; *ligament* of a gold colour.

Species LIV. *Amblema rubra*—(*Unio rubra.*)

Shell thick, ventricose, somewhat elliptical; *apices* scarcely prominent, with a slight oblique or broad sinus; *furrow* posterior; *axis* almost lateral; *epidermis* wrinkled, blackish; *nacre* purple-red. Length $\frac{5}{7}$—diam. $\frac{4}{7}$—axis $\frac{1}{7}$ of the breadth.

Var. 1.—*lineata*—reddish brown, streaked with brown lines.

Var. 2.—*pallida*—brownish, nacre pale.

Found in the Kentucky ; about two inches in length ; it bears some resemblance to the *Elliptio* and *Obliquaria ellipsaria* ; *lamellar tooth* somewhat obtuse, very slightly oblique ; *cardinal tooth* thick, rugose ; *nacre* fine, iridescent, changeable with blue ; no *fossule* ; *animal* yellowish.

Species LV.—*Amblema torulosa*—(*Unio torulosa.*)

Shell thick, somewhat ventricose, square-elliptical, with a slight oblique *depression*, and some *nodules* ; *borders* flexuous ; *epidermis* olive coloured, with flexuous *wrinkles* ; *nacre* bluish white. Breadth $\frac{3}{4}$—diam. $\frac{1}{2}$—axis $\frac{1}{5}$ of the length.

Var. *angulata*—depression slight, contour nearly angular.

Found in the Ohio and Kentucky ; length two inches ; two or three *nodules* on the oblique *elevation* ; *lamellar tooth* very straight ; no *fossule* ; *cardinal tooth* wrinkled.

Species LVI. *Amblema gibbosa*—(*Unio gibbosa.*)

Shell thick, ventricose, oval-elliptical, with

with two large knotty *ribs*, oblique, with intermediary *depression; edges* flexuous; *epidermis* reddish brown, almost smooth; *nacre* white. Breadth $\frac{2}{3}$—diam. $\frac{4}{7}$—axis $\frac{2}{9}$ of the length.

Var. 1. *olivacea*—epidermis olive coloured, with flexuous wrinkles.

Var. 2. *radiata*—with radiated pale lines.

Var. 3. *difformis*—with irregularly formed hunches (*bosselures*) and depressions.

Very common in the Ohio and adjacent rivers; length from one to three inches; *lamellar tooth* short, oblique, obtuse; *fossule* visible; *cardinal tooth* wrinkled; *apices* prominent, heart-shaped. This species strongly resembles the genus *Obliquaria*, but the *cardinal tooth* is under the *apex*, and almost inferior.

SPECIES LVII. *Amblema costata*—(*Unio costata.*)

Shell somewhat thick, flattened, slightly square, with large longitudinal *ribs* a little oblique, flexuous, dilated into a *wing* under the *ligament*, with curved *oblique ribs; borders* undulated; *epidermis* yellowish, almost smooth; *nacre* white, iridescent. Breadth $\frac{4}{5}$—diam. $\frac{3}{10}$—axis $\frac{3}{20}$ of the length.

This is one of the handsomest shells produced in the Ohio; rare in that river, but less so in the tributaries of the Kentucky, &c. it attains almost six inches in length; *nacre* tinted with flesh colour, with changes of violet; produces pearls; I have seen one of these which was of an oblong form, measuring a quarter of an inch in length.* *Apices* oblique, wrinkled, entire; *lamellar tooth* long, broad, sharp, compressed, slightly oblique; no fossule; *cardinal tooth* striated inferiorly. Interior *borders* undulated; animal yellow.

Third sub-family—*Anodontidea.*

Shell transverse, neither *cardinal* nor *lamellar teeth.*

Ninth Genus—Anodonta.

Shell elliptical or oval; *ligament* straight, or curved; *axis* extramedial; three *muscular impressions*, slightly apparent; *contour* somewhat

* A highly respectable friend, and zealous conchologist, (James S. Craft, Esq. of Pittsburg, Pa.) possesses a pearl, that is very little inferior in lustre and beauty to the oriental product; he obtained it from one of the Ohio Unios. —Trans.

thickened ; *animal* resembles that of the Unio. This genus may be divided into three very distinct sub-genera.

First Sub-Genus—ANODONTA.

No *lamellar wrinkles* on the hinge. This sub-genus comprehends the greater part of the species, viz :—*A. Anatina*, *A. cygnea*, *A. radiata*, *A. marginata*, SAY—*A. cataracta*, SAY,—besides the two following species which I observed in the Hudson river.

ANODONTA ATRA.

Shell ventricose, thin, smooth, elliptical, blackish; *nacre* white anteriorly, reddish brown, iridescent posteriorly. Length $\frac{1}{2}$—diam. $\frac{5}{12}$—axis $\frac{1}{3}$ of the breadth. Breadth does not exceed six inches.

ANODONTA CUNEATA.

Shell slightly ventricose, thin, elliptical, attenuated posteriorly ; *epidermis* wrinkled, olive brown ; *nacre* bluish white. Length $\frac{1}{2}$—diam. $\frac{1}{4}$—axis $\frac{1}{4}$ of the breadth. Breadth four to five inches.

Second Sub-Genus—STROPHITUS.

Hinge with a marginal projection under the apex.

The *Anodonta undulata* of SAY forms this sub-genus, which, with the following, might be considered a genus.

Third Sub-Genus—LASTENA.

Hinge with two transverse wrinkles, obtuse, almost lamelliform, divergent on each side of the *apex; ligament* straight, membranous, double, either anterior or posterior.

SPECIES LVIII. *Anodonta Ohiensis*—(*Lastena Ohiensis.*)

Shell very thin, fragile, translucent, ventricose, elliptical, somewhat *winged*, and obliquely truncated posteriorly; *apices* entire, wrinkled; *epidermis* smooth, olive coloured or brown; *nacre* bluish. Length $\frac{5}{9}$—diameter and axis $\frac{1}{3}$ of the breadth.

Var. 1. *radiata*—olivaceous copper coloured, with radiated bands, greenish.

Var. 2. *viridis*—epidermis of a fine olive green colour.
Var. 3. *violacina*—nacre violaceous.
Var. 4. *nigrescens*—blackish olive.

Very common in the Ohio, and all the adjacent rivers. Breadth from two to four inches; the *lamellar wrinkles* are wholly separated from the *edges* of the shell; the *posterior wing* is compressed, angular, sloping and brownish. It might perhaps have been proper to name this species *A. mutabilis.*

SPECIES LIX. *Anodonta lata*—(*Lastena lata.*)

Shell very thin, fragile, translucent, convex, oblong-elliptical; *apices* decorticated, almost invisible; *epidermis* brown, blackish anteriorly; *nacre* bluish, violet under the apices. Length $\frac{3}{8}$—diam. $\frac{2}{9}$—axis $\frac{1}{4}$ of the breadth.

Found in the Kentucky, &c. rare; breadth from two to three inches; *lamellar wrinkles* at the anterior edge, scarcely apparent. This species ought perhaps to form another sub-genus *Hemistena*, or be united to the first sub-genus, but that the *ligament* is double or extended from the two sides of the apices. The *Lastenæ* approach the genus *Dipsas*, [of LEACH.]

Fourth sub-family—*Alasmidia.*

Shell transverse ; one primary *anterior tooth ;* no lamellar tooth.

Tenth Genus—Alasmidonta.

Shell oval or elliptical, *axis* extramedial ; three *cicatrices* or *muscular impressions ; ligament* straight, imbricated, &c.

Species LX. *Alasmidonta marginata.*

Shell oval-elliptical ; sloped posteriorly, with oblique, obtuse wrinkles ; *epidermis* olive brown, radiated with green, and wrinkled zonally ; *nacre* bluish white, with white *edges ; tooth* simple, compressed, oblique. Length $\frac{1}{2}$ of the breadth.

This genus and species were established by Say ; (vide *Journal of the Academy of Natural Sciences of Philadelphia*, vol. i. p. 459,) who also refers to this genus the *Unio undulatus* (vide American edition of Nicholson's Dictionary, article Conchology and Tab. III. fig. 3.) ; to these must be added also the following species.

The above described species is found in the Scioto river ; length two and an half inches. I

have not seen the animal, but the shell I have, in the cabinet of the Academy.

Species LXI. *Alasmidonta costata.*

Shell thin, elliptical, slightly ventricose ; somewhat sinuous anteriorly ; undulated with broad *curved ribs* posteriorly ; *epidermis* almost smooth, olive coloured anteriorly, blackish posteriorly ; *nacre* white, tinged with flesh colour ; *tooth* bilobed, compressed, oblique, crenulated. Length $\frac{1}{2}$—diam. $\frac{1}{4}$—axis $\frac{2}{9}$ of the breadth.

I observed this fine shell in the museum of Mr. Clifford of Lexington, Ky. from the Kentucky river, where it appears to be rare ; breadth nearly five inches ; decorticated anteriorly and superiorly, but very entire posteriorly ; *ribs* very large inferiorly ; *ligament* horny and shelly, imbricated ; *tooth* decurrent ; in the place of the lamellar tooth a small, short, oblique angle ; small *tubercles* in the interior.

Fifth sub-family—*Cycladia.*

Shell almost equilateral, two *lamellar teeth ;* one anterior, the other posterior; often one or more *cardinal teeth* intermediary, under the *apex.*

Eleventh Genus—CYCLAS.

Two *muscular impressions; lamellar teeth* oblique; *wrinkles* zonal; *contour* not thickened.

This genus should be reformed, notwithstanding the labours of MEGERLE and FERUSSAC. I propose to divide it into four sub-genera, which may perhaps form as many genera.

1st. *Polymesoda.* Many *intermediary teeth* on both valves; *shell* rounded or somewhat transversal. Type *Cyclas caroliniana*, Bosc, &c.

2d. *Phymesoda.* One *intermediary tooth* in one valve; *shell* somewhat transversal. Type *Cyclas lacustris—C. dubia*, SAY, &c.

3d. *Amesoda.* No *intermediary tooth* in one valve, at least; *shell* slightly transversal. Type *Cyclas similis*, SAY. *C. lasmampsis*, &c.

4th. *Corbicula* (MEGERLE.) Many *intermediary teeth* in both valves; *shell* triangular, somewhat lengthened. Type *Cyclas hammalis*, *C. fluviatilis*, &c.

SPECIES LXII. *Cyclas lasmampsis*—(*Amesoda lasmampsis.*)

Shell translucent, ventricose, slightly rounded; *wrinkles* close together, unequal, more distant and broad superiorly; *lamellar teeth* flexuous, the

anterior twisted, extended; length $\frac{3}{4}$—diam. $\frac{1}{2}$—axis $\frac{5}{12}$ of the breadth; *nacre* bluish; breadth one third, or half an inch; *epidermis* variable, black, blackish, brown, brownish, olive; reddish brown, horn colour, &c.; *apices* rounded, not prominent. Found in the Ohio, and adjacent rivers; no intermediary teeth.

Species LXIII. *Cyclas æqualis*—(*Phymesoda æqualis.*)

Shell translucent, ventricose, rounded; *wrinkles* close together, almost equal, obtuse; *lamellar teeth* somewhat flexuous, short, distant, equal; *intermediary tooth* oblique, single in each valve; *epidermis* corneous; *nacre* bluish. Length $\frac{4}{5}$—diam. $\frac{2}{3}$ of the breadth; axis medial.

A small species; length one quarter of an inch, rare; found in the Ohio; *internal tooth* scarcely apparent, obliquely inclined posteriorly; *right valve* with two oblong lamellar and almost equal fossules; the *left valve* with a corresponding *lamellar tooth*; *apices* rounded, not prominent.

Supplement.

In this place I shall describe two species that have a slight relation to the subject; viz. a trivalve shell and a mytilus from Louisiana. I have added also some species that have been omitted in their proper places, or discovered during the progress of the work.

Twelfth Genus—Tremesia.

Shell tri-valve, inequivalve, *principal valve* patelloid, perforated in the centre; the *small valve* closing this aperture, as an operculum; *third valve* inferior, lateral; the *animal* cephalous, the *head* extensible by the medial opening, with two lateral *eyes*; no tentacula.

This singular genus appears to be the type of a new family intermediate between the *Brachiopes*, *Teredaria*, and *Patellaria*; like the *teredaria* it has three valves, but a head like the *patellaria*, and this oculated and not tentaculated head is central instead of being terminal.

Species LXIV. *Tremesia patelloides.*

Principal valve rounded, somewhat conical, striated concentrically, and tessellated by curved oblique transversal striæ; *aperture* round; *small valves* smooth; *inferior valve* oblique, oboval; *animal* striated flexuously beneath, acute opposite the inferior valve; *head* truncated.

Animal very singular; which I announced in the American Monthly Magazine, last year, under the defective name of *Notrema.* It is found in the lower part of the river Ohio, attached to the stones by the base, like the *Patellæ; shell* brownish fawn coloured; *opercular valve* brown, glossy, movable; diam. about one inch, height half an inch.

Species LXV. *Mytilus recurvus.*

Shell oboval, cuneiform, recurved, with longitudinal *striæ* of three lengths; *epidermis* blackish; *nacre* violet; the beaks oblique, with a decurrent angle on each side; the inferior and interior *border*, striated, crenulated. Breadth $\frac{7}{12}$—diam. $\frac{5}{12}$ of the length.

Found in the Mississippi near New Orleans—

length from one to two inches; the *striæ* are often bifid; the gaping part oblong, lateral.

Species LXVI. *Unio teres*—(*Elliptio teres.*)

Shell slightly thick, ventricose, elliptical, widened, truncated, inferiorly, posteriorly, and obliquely; *epidermis* almost smooth, corneous; *nacre* white, iridescent. Length about $\frac{2}{5}$—diam. $\frac{2}{3}$—axis $\frac{1}{5}$ of the breadth; this species belongs to the sub-genus *Eurynia*—vide page 24.

Found in the river Wabash; breadth about three inches; slightly sinuous inferiorly; *apices* eroded; *lamellar tooth* long, thin; *cardinal tooth* crenulated, decurrent.

Species LXVII. *Obliquaria sinuata*—(*Unio sinuata.*)

Shell thick, ventricose, elliptical, sinuous inferiorly; *epidermis* reddish brown, wrinkled; *nacre* white, with deep oblique interior *furrows*. Length $\frac{1}{2}$—diam. $\frac{1}{3}$—axis $\frac{1}{4}$ of the breadth. This species belongs to the sub-genus *Ellipsaria*. Vide page 35, found in the Kentucky—breadth four inches; *lamellar tooth* thick, oblique,

straight, wrinkled; *fossule* visible ; *cardinal tooth* striated.

Species LXVIII. *Obliquaria atroviolacea*— (*Unio atroviolacea.*)

Shell somewhat thick, convex, elliptical, oval, and posteriorly attenuated; *epidermis* blackish, almost smooth ; *nacre* very deep violet colour; *border* dull brown. Length $\frac{1}{2}$—diam. $\frac{1}{4}$—axis $\frac{1}{5}$ of the breadth. This species belongs to the sub-genus *Ellipsaria*, Vide page 35.

A handsome species with a fine *nacre;* breadth three inches—found in the Kentucky, &c. *lamellar tooth* carinated straight ; *fossule* confluent; *muscular impressions* deep ; *teeth* wrinkled.

Species LXIX. *Obliquaria Cliffordiana*— (*Unio Cliffordiana.*)

Shell thick, ventricose, oval, rounded; very long posteriorly ; sloped posteriorly ; *nacre* nearly smooth, blackish, pale purple. Length $\frac{3}{4}$—diam. $\frac{2}{5}$—axis $\frac{1}{4}$ of the breadth. This species belongs to the sub-genus *Plagiola*. Vide page 32.

In the museum of Mr. Clifford ; found in the Kentucky. Breadth three inches ; *lamellar tooth*

curved, thick, wrinkled ; *fossule* visible ; *cardinal tooth* striated ; *apices* slightly prominent, decorticated ; *nacre* smooth, saffron colour.

REMARKS.

When the *ligament* is mentioned in the preceding pages, the great posterior one is alluded to ; there is also an anterior membranous and foliaceous ligament in all these shells, which is very small and short, in the elongated or rounded, and larger or oblong, in the elliptical or dilated shells.

Having more carefully examined the species, No. 48. *Obovaria pachostea*, vide page 51, I have discovered that it belongs to the genus *Amblema*, to which it must be united, its characters are as follow :—

Amblema antrosa, very thick, somewhat ventricose, rounded, flexuous with a small lateral *sinus* inferiorly ; *epidermis* brown, lamellar ; *nacre* violaceous, pale, undulated, and a large *cavity* under the *bilobed* (cardinal) tooth. Breadth $\frac{6}{7}$—diam. $\frac{1}{2}$ of the length ;—axis almost terminal.

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☞ Page 24, 3d line from bottom, for *Eurinea* read *Eurynia*.